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NASA TECH BRIEF



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Maximum RMS Error Comparison of Several Redundancy Techniques

The problem:

Development of a numerically simple technique for data reduction and reconstruction based upon limiting slope analysis. When speed is not important, concisely accurate methods of curve fitting are available, but in the case of real time industrial process control applications, speed and simplicity are mandatory. Where large volumes of data are stored and sampled, the use of the step, two-point projection (slope), and fan methods of redundancy reduction and reconstruction are too time consuming for quick decision making.

The solution:

An original first order technique called the "Limiting slope" method that results in a maximum possible RMS error versus data compression ratio advantage of 2-to-1 over the step and fan methods and 3-to-1 over the two-point projection (slope) method.

How it's done:

A paper has been prepared that presents a purely mathematical comparison of the above-mentioned

techniques with the "Limiting slope" technique, based on a maximum RMS error versus data compression ratio. The RMS error deviations are based on a worst-case reconstruction of N redundant points between two nonredundant points, and then are extended to cover the more general case of RMS error over an entire curve, given the data compression ratio.

Note:

Documentation is available from:
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No patent action is contemplated by NASA.
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